

- c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;
- d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;
- e) said housing being elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and said fluid containing region of said housing and said electromagnet means being in axially spaced relation along said housing longitudinal axis;
- f) said armature pole portion occupying a major portion of the one of said chambers in which it is located and having a lateral dimension several times greater than the longitudinal dimension thereof;
- g) said armature pole portion having a fluid-contacting section of material which is compatible with and corrosion resistant to the fluid delivered by said system, said armature pole portion comprising a body of magnetic material within a titanium enclosure; and
- h) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagnet means located in said fluid

d  
containing region of said housing and external to said electromagnet means for closing said gap in response to electrical energization of said electromagnet to move said armature and change the control state of said valve.

[ Please cancel claim 2 in view of new claim 34.

Claim 3, on line one change "2" to --34--.

Claim 6, on line one change "2" to --34--.

Please rewrite claim 7 in amended form as follows:

c2 16x. (Amended) A valve according to claim [1] 34, wherein said armature pole portion [comprises a body of magnetic material] is in the [form] shape of a disc wherein the opposite axial end faces of said disc are disposed substantially perpendicular to the direction of travel of said armature and wherein the periphery of said disc is located close to the inner surface of said housing.

[ Please cancel claim 8.

Please rewrite claim 9 in independent form as new claim 35 as follows:

3 2\35. A low power electromagnetic valve for use with implantable fluid delivery systems, said valve comprising:

- a) a housing including a fluid containing region having first and second chambers and first and second ports in fluid communication with said first and second chambers, respectively;
  - b) electromagnet means carried by said housing and located externally of said fluid containing region;
  - c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;
  - d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and
- 36

- 63
- having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;
- e) said housing being elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and said fluid containing region of said housing and said electromagnet means being in axially spaced relation along said housing longitudinal axis;
  - f) said armature pole portion occupying a major portion of the one of said chambers in which it is located and having a lateral dimension several times greater than the longitudinal dimension thereof;
  - g) said armature pole portion having a fluid-contacting section of material which is compatible with and corrosion resistant to the fluid delivered by said system; and
  - h) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagnet means located in said fluid containing region of said housing and external to said electromagnet means for closing said gap in response to electrical energization of said electromagnet to move said armature and change the control state of said valve;
  - i) said armature pole portion contacting a surface of said barrier means when said gap is closed to change the control state of said valve and said barrier means
- 37

c3  
being provided with passage means along said surface to reduce the time required for said pole portion to separate from said barrier means during movement of said armature and to reduce surface tension effects between said barrier and said pole portion.

Please cancel claim 9 in view of new claim 35.

Claim 10, on line one change "9" to --35--.

Claim 11, on line one change "9" to --35--.

Please rewrite claim 12 in independent form as new claim 36 as follows:

c4  
2436. A low power electromagnetic valve for use with implantable fluid delivery systems, said valve comprising:

- a) a housing including a fluid containing region having first and second chambers and first and second ports in fluid communication with said first and second chambers, respectively;
- b) electromagnet means carried by said housing and located externally of said fluid containing region;
- c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;
- d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;

- 34
- e) said armature pole portion being provided with a longitudinally extending bushing and said armature plunger portion comprising a shaft received in said bushing so that the length of the plunger can be changed to adjust the stroke;
  - f) said housing being elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and said fluid containing region of said housing and said electromagnet means being in axially spaced relation along said housing longitudinal axis;
  - g) said armature pole portion occupying a major portion of the one of said chambers in which it is located and having a lateral dimension several times greater than the longitudinal dimension thereof;
  - h) said armature pole portion having a fluid-contacting section of material which is compatible with and corrosion resistant to the fluid delivered by said system; and
  - i) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagnet means located in said fluid containing region of said housing and external to said electromagnet means for closing said gap in response to electrical energization of said electromagnet to move said armature and change the control state of said valve.

Please cancel claim 12 in view of new claim 36.

Claim 13 on line one change "1" to --34--.

claim 14 on line one change "1" to -34--.

Please rewrite claim 16 in independent form as new claim 37 as follows:

26  
37. A low power electromagnetic valve for use with implantable fluid delivery systems, said valve comprising:

- a) a housing including a fluid containing region having first and second chambers and first and second ports in fluid communication with said first and second chambers, respectively;
- b) electromagnet means carried by said housing and located externally of said fluid containing region;
- c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;
- d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;
- e) said housing being elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and said fluid containing region of said housing and said electromagnet means being in axially spaced relation along said housing longitudinal axis;
- f) said armature pole portion occupying a major portion of the one of said chambers in which it is located and having a lateral dimension several times greater than the longitudinal dimension thereof;

- c5
- g) said armature pole portion having a fluid-contacting section of material which is compatible with and corrosion resistant to the fluid delivered by said system;
  - h) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagnet means located in said fluid containing region of said housing and external to said electromagnet means for closing said gap in response to electrical energization of said electromagnet to move said armature and change the control state of said valve; and
  - i) said armature plunger portion being provided with guiding means in the form of a flange disposed substantially perpendicular to the direction of armature travel and having a peripheral surface in closely spaced relation to the inner surface of said housing.

Please cancel claim 16 in view of new claim 37.

Claim 17, on line one change "16" to --37--.

Please rewrite claim 18 in independent form as new claim 38 as follows:

c6 27 38. A low power electromagnetic valve for use with implantable fluid delivery systems, said valve comprising:

- a) a housing including a fluid containing region having first and second chambers and first and second ports in fluid communication with said first and second chambers, respectively;
  - b) electromagnet means carried by said housing and located externally of said fluid containing region;
  - c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;
- 41

- c4
- d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;
  - e) said housing being elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and said fluid containing region of said housing and said electromagnet means being in axially spaced relation along said housing longitudinal axis;
  - f) said armature pole portion occupying a major portion of the one of said chambers in which it is located and having a lateral dimension several times greater than the longitudinal dimension thereof;
  - g) said armature pole portion having a fluid-contacting section of material which is compatible with and corrosion resistant to the fluid delivered by said system, said armature pole portion comprising a solid body of chrome-molybdenum-iron alloy heat treated to provide enhanced magnetic flux density and coercive force properties; and
  - h) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagnet means located in said fluid containing region of said housing and external to said



electromagnet means for closing said gap in response to electrical energization of said electromagnet to move said armature and change the control state of said

STET valve.

Please cancel claim 18 in view of new claim 38.

Please rewrite claim 19 in independent form as new claim 39 as follows:

39. A low power electromagnetic valve for use with implantable fluid delivery systems, said valve comprising:

- a) a housing including a fluid containing region having first and second chambers and first and second ports in fluid communication with said first and second chambers, respectively;
- b) electromagnet means carried by said housing and located externally of said fluid containing region;
- c) barrier means of fluid-impervious material for isolating said electromagnet means from said fluid containing region of said housing;
- d) an armature movably positioned in said fluid containing region of said housing and having a pole portion located in one of said first and second chambers for magnetic attraction by said electromagnet means and having a plunger portion provided with valve means located in the other of said first and second chambers for opening and closing one of said ports to place said ports in fluid communication through said fluid containing region of said housing in one control state of said valve and to block fluid communication between said ports through said fluid containing region of said housing in another control state of said valve;
- e) said armature pole portion and said plunger portion being of fixed length and said one port being located in a component of said housing separated from the remainder of said housing by shim means so as to allow

- adjustment of the distance between said one port and said valve means on said plunger portion;
- f) said housing being elongated having a longitudinal axis, said armature being positioned for movement along said housing longitudinal axis, and said fluid containing region of said housing and said electromagnet means being in axially spaced relation along said housing longitudinal axis;
- g) said armature pole portion occupying a major portion of the one of said chambers in which it is located and having a lateral dimension several times greater than the longitudinal dimension thereof;
- h) said armature pole portion having a fluid-contacting section of material which is compatible with and corrosion resistant to the fluid delivered by said system; and
- i) means for defining a magnetic circuit including said electromagnet, said armature pole portion, a portion of said barrier means and a gap between said pole portion and said electromagnet means located in said fluid containing region of said housing and external to said electromagnet means for closing said gap in response to electrical energization of said electromagnet to move said armature and change the control state of said valve.

Please cancel claim 19 in view of new claim 39.

Please cancel claim 20.

Claim 21 on line one change "1" to --34--.

#### Remarks

This amendment is made for the purpose of placing provisionally allowed claims in independent form, amending some of the rejected dependent claims to be dependent on allowed independent claims and cancelling the remaining rejected claims,